

What is claimed is:

1. A high-pressure discharge lamp lighting apparatus, comprising:

5 a DC power source;

an inverter for converting a DC supplied from the DC power source to an AC;

an AC path for transmitting the AC output from the inverter to a high-pressure discharge lamp;

10 a resonator having a predetermined resonance frequency, and interposed in the AC path;

an inverter controller for controlling the inverter according to its variable frequency oscillation function by selectively impressing a first frequency in the stable operation window free from causing  
15 acoustic resonance in the high-pressure discharge, and a second frequency higher than the first frequency to the inverter;

a lamp wattage detector for detecting the lamp wattage of the high-pressure discharge lamp from a voltage across the high-pressure discharge lamp and a current flowing through the  
20 high-pressure discharge lamp; and

a time ratio controller for controlling a the time ratio based on a lamp voltage of the discharge lamp detected in the steady lighting state using a lamp wattage detector so as that the inverter outputs at the first frequency and the second frequency are  
25 alternately impressed to the high-pressure discharge lamp at an adequate time;

2. A high-pressure discharge lamp lighting apparatus as claimed in claim 1, wherein the second frequency being the frequency in other stable operation windows free from causing the  
5 acoustic resonance in the high-pressure discharge lamp.

3. A high-pressure discharge lamp lighting apparatus as claimed in claim 1, wherein the second frequency being the frequency in an astable operation window in which acoustic  
10 resonance occurs with the high-pressure discharge lamp.

4. A high-pressure discharge lamp lighting apparatus as claimed in claim 1, wherein the second frequency generally corresponds with the resonance frequency of the resonator.  
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5. A high-pressure discharge lamp lighting apparatus as claimed in claim 1, wherein for the inverter controller outputting frequency corresponding to resonance frequency of the resonator in general at the time of starting the high-pressure discharge lamp,  
20 and operating the inverter.

6. A high-pressure discharge lamp lighting apparatus as claimed in claim 1, wherein setting a time ratio of the first frequency as a range which is 10 - 100 % in the time ratio  
25 controller.

7. A high-pressure discharge lamp lighting apparatus as claimed in claim 1, wherein the time ratio controller controls the time ratio so as that the ratio of a lamp power W1 of the high-pressure discharge lamp during lighting at the first frequency and a lamp power W2 of the high-pressure discharge lamp during lighting at the second frequency is given by an equation;  $W1/W2 \leq 2.0$ .

8. A high-pressure discharge lamp lighting apparatus as claimed in claim 1, wherein the two-operations alternating frequency is equal to or higher than 100 Hz and lower than the first frequency.

9. A high-pressure discharge lamp lighting apparatus as claimed in claim 1, wherein the time ratio controller controls the time ratio so as that the lamp voltage of the high-pressure discharge lamp does not exceed a voltage at the time that the lamp power becomes maximum in the operating at the first frequency.

10. A high-pressure discharge lamp lighting apparatus as claimed in claim 1, wherein the resonance frequency of the resonator is set in two to three times the first frequency, and the time ratio controller controls the time ratio so as that the lamp voltage does not exceed a voltage at the time that the lamp voltage in the operation at the second frequency reaches a prescribed value.

11. A high-pressure discharge lamp lighting apparatus as claimed in claim 1, wherein the time ratio controller starts after the inverter has started.

5        12. A high-pressure discharge lamp lighting apparatus as claimed in claim 11, wherein the DC power source has a rectifier for rectifying a commercial AC power source, and the time ratio controller is supplied its operating power from a smoother associated to the rectifier.

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13. A high-pressure discharge lamp lighting apparatus as claimed in claim 11, wherein the time ratio controller is supplied its operating power from the resonator.

15        14. A high-pressure discharge lamp lighting apparatus as claimed in claim 1, wherein the time ratio controller starts after the inverter controller has started.

20        15. A high-pressure discharge lamp lighting apparatus as claimed in claim 1, wherein the time ratio controller and the inverter controller have their own power sources with different start-up times, and their start timings are adjusted by the differences of those start-up times.

25        16. A high-pressure discharge lamp lighting apparatus as claimed in claim 1, wherein an operating power of the inverter

controller is supplied from a switching snubber associated to the inverter, and an operating power of the time ratio controller is supplied from a smoother associated to a rectifier of the DC power source.

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17. A high-pressure discharge lamp lighting apparatus as claimed in claim 14, wherein the time ratio controller is a high-pressure discharge lamp lighting apparatus as claimed in claim 14, wherein an operating power of the inverter controller is supplied from the switching snubber associated to the inverter, and an operating power of the time ratio controller is supplied from the resonator.

18. A luminaire comprising:  
15 a high-pressure discharge lamp lighting apparatus as defined by any one of preceding claims 1 to 17;

a high-pressure discharge lamp to be lit up with the high-pressure discharge lamp lighting apparatus; and

a appliance of an instrument with which it is equipped with  
20 the high-pressure discharge lamp.